THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

TOWNSHIP OF TISDALE

DISTRICT OF COCHRANE

1966

R E P O R T

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WATER POLLUTION SURVEY

of the

TOWNSHIP OF TISDALE

District of Cochrane

June 1966

Division of Sanitary Engineering

INDEX

THE ONTARIO WATER RESOURCES COMMISSION

R E P O R T

INTRODUCTION

A water pollution survey was conducted in the Township of Tisdale during the fall of 1965. The purpose of the survey was to locate and record all significant sources of water pollution within the township. Such surveys are performed routinely, and upon request, by the Ontario Water Resources Commission as a basis for evaluating all existing and potential sources of pollution. When sources of pollution are found, corrective action is requested by the Commission. Where water and/or pollution control works appear desirable or expansions to present facilities are necessary, the Commission has a programme to aid in the construction and financing of these works.

The information received from the township officials is gratefully acknowledged.

I GENERAL INFORMATION

The Township of Tisdale with a 1965 assessed population of 8,206 (1966 Municipal Directory) is located in the District of Cochrane.

Two main areas of urbanization occurring in the township are the communities of Schumacher and South Porcupine. Schumacher with an approximate population of 3,224 lies within a rocky terrain with a general overburden of sandy soil and is located one mile east

of the Town of Timmins on Highway No. 101. Four miles to the east of Schumacher lies the community of South Porcupine. This community with an approximate population of 4,507 is situated in an area where heavy clay is predominant with the land rising gently to the west of Porcupine Lake.

The greater part of the Township of Tisdale lies within the Frederick House River watershed. The township is included in the Porcupine area which is Canada's leading gold mining centre. Economically, residents rely mainly on the mining developments within the Porcupine area.

II WATER USES

1. Municipal Water Systems

(a) Schumacher- The community of Schumacher obtains chlorinated water from the Hollinger Consolidated Gold Mines water works. The water is fluoridated by the township prior to entering the Schumacher distribution system. Fluoride is fed by a Wallace and Tiernan semi-automatic volumetric fluoridator. The bacteriological quality of the water was satisfactory at the time of the last OWRC inspection on December 1, 1965.

A summary of the plant records are included in the tables appended to this report.

(b) South Porcupine- Water for this community is obtained from two well supplies. The water receives chlorination and fluoridation treatment prior to being pumped to a 1,500,000 gallon

capacity concrete ground reservoir. From the reservoir, the water flows by gravity to South Porcupine.

A summary of the plant records is also included in the tables appended to this report.

2. Industrial Water Supplies

(a) Dome Mines Limited- Water for domestic purposes at this mine is obtained from the South Porcupine water works. Approximately 1.5 million Imperial gallons are consumed per month. Water for industrial purposes is obtained from three sources: Porcupine Lake, Simpson Lake, and a ground-water supply. It is estimated that 650,000 U.S. gpd are pumped from Porcupine Lake; 150,000 U.S. gpd from Simpson Lake; and 200,000 U.S. gpd from mine ground water.

(b) McIntyre Porcupine Mines Limited- Water for domestic and industrial purposes is supplied by the Hollinger Consolidated Gold Mines water works. It is estimated that 12,000,000 Imperial gallons are utilized per month. Cooling water for mining operations is pumped from Pearl Lake.

(c) Porcupine Paymaster Mines Limited- The Porcupine Paymaster Mines are located in Deloro and Tisdale townships. The mining development located in the Township of Tisdale obtains the domestic water supply from a ground-water source and serves five residences on the mine site. Water for industrial purposes is pumped from Simpson Lake.

(d) Preston Mines Limited- Three water supplies are operated by the mine. The Simpson Lake supply receives chlorination treatment prior to being pumped to the distribution system which serves 12 residences in the New York Porcupine mine townsite. An artesian well serves the mine and surface buildings and 18 residences. Water from a diamond drill hole is utilized as a domestic supply for underground employees.

3. Recreational

There are no public beaches within the township and swimming is restricted to swimming pools located in the communities. The small lakes within the township are not known to be good fishing sites; however, some fishing is done in Porcupine Lake.

III WATER POLLUTION

1. Sanitary Waste Disposal

(a) Schumacher- The Community of Schumacher is served by four municipal septic tanks. The No. 1 Railway Street septic tank, consisting of two grit chambers and two settling tanks, has a capacity of 159,250 gallons to serve an approximate population of 2,400 with effluent discharging to Pearl Lake. The No. 2 First Avenue septic tank located at the bottom of Tamarack Street serves a population of 550 and consists of two settling tanks with a combined capacity of 67,200 gallons. Effluent is discharged to Pearl Lake. The No. 3 septic tank serving the eastern portion of Schumacher has

a capacity of 37,500 gallons with effluent discharging to a drainage ditch which is a tributary of Porcupine River.

Gold Centre, which is an urbanized area of 100 people located one-half mile southeast of Schumacher, is served by the No. 4 septic tank of 37,500 gallons capacity. Effluent is discharged to a tributary of Porcupine River.

(b) South Porcupine- The Community of South Porcupine is served by a separate sewer system. Storm sewers within the community outfall to Porcupine River and Porcupine Lake. Sanitary wastes are directed to two municipal septic tanks. The No. 1 Evans Street septic tank, serving the southern portion of South Porcupine with an approximate population of 2,200, has a capacity of 80,625 gallons with effluent discharging to Porcupine River.

The No. 2 Rae Street septic tank of 97,875 gallons capacity serves a population of 2,250. Septic-tank effluent is discharged to Porcupine Lake.

2. Industrial Waste Disposal

(a) Dome Mines Limited- This gold mining development employs approximately 825 people and mines an estimated 2,000 tons of ore per day. Sanitary wastes from the mine office buildings, cyanide mill, and the 125 residences within the mine townsites are directed to septic tanks. Effluents from the septic tanks serving the mine offices and mill are discharged along with the industrial wastes to a tributary of Porcupine River.

(b) McIntyre Porcupine Mines Limited- The McIntyre Porcupine Mines Limited employs approximately 900 people and mine an estimated 2,500 tons of ore per day from which gold and copper are extracted. There are only 11 residences within the general area of the mine office buildings. Each of the houses have separate septic-tank systems with outfalls to Pearl Lake. Sanitary wastes from the mines and mine buildings are directed to one septic tank which also outfalls to Pearl Lake. Water from Pearl Lake is used as a cooling water supply and is returned to Pearl Lake. Coarse rock, in which the slimes have been removed, is used as backfill to Pearl Lake.

(c) Porcupine Paymaster Mines Limited- Approximately 275 people are employed at this gold mine which mines 15,000 tons of ore per month. The mining development located in the Township of Tisdale has five residences in the mine townsite. Two of the houses have separate septic-tank systems, while the remaining houses are served by one septic tank. Septic-tank effluent and industrial waste water are discharged to a swampy area north of the mine site.

(d) Preston Mines Limited- This gold mine employs approximately 250 people and production is estimated at 16,000 tons of ore per month. Sanitary waste disposal for the mine and mine townsite is provided by four septic tanks. Effluents from the septic-tank systems are discharged to a tailings area.

(e) Hollinger Consolidated Gold Mines Limited- Sanitary wastes from various mine buildings are discharged to several septic tanks in which the effluents drain eventually to either Pearl Lake or Gillies Lake.

The septic-tank effluents from No. 11 shaft and hoist house, steel shop, central shaft and hoist house, refinery, boiler room, and main office are discharged through three separate woodstave sewer pipes to a drainage ditch. This ditch runs in an easterly direction parallel to Highway No. 101 and enters Pearl Lake. Domestic sewage from No. 19 shaft area enters a septic tank which discharges to the Schumacher sewer system.

(f) Airways- The Georgian Bay Airways Limited and the Austin Airways Limited are located on the west shore of Porcupine Lake in the community of South Porcupine. On inspection of the docks at Georgian Bay Airways Limited where the sea-planes are refueled, it was noticed that considerable fuel-oil was leaking from a drum. Caution should be taken when refueling or when maintenance operations are carried out to ensure that the minimum of oil is allowed to be discharged to Porcupine Lake.

3. Discussion of Sample Analyses

The laboratory results of the bacteriological examinations and chemical analyses of samples collected from the watercourses and outfalls are included in the tables appended to this report.

Descriptions of the tests and an outline of the OWRC objectives are also included.

The samples, collected from the Hollinger septic-tank outfalls, showed that the 5-Day BOD and suspended solids concentration were generally satisfactory considering the type of treatment provided. However, the sample collected from the drainage ditch receiving the effluents from the Hollinger septic tanks and flowing to the pond in McIntyre Park revealed a total coliform count of 4,300 coliforms per 100 c.c. This is in excess of the Commission's maximum objective of not greater than 2,400 coliforms per 100 c.c. and indicates mild ditch contamination.

A sample, collected from the creek draining McIntyre Park and flowing into Pearl Lake, revealed that the 5-Day BOD and total coliform count were satisfactory and within the Commission's objective. It is suspected that during periods of low flow or dry weather flow the water would be adversely affected by the discharges from the Hollinger Mines.

Effluent from the septic tank serving the McIntyre Community Arena was sampled and it was revealed that the 5-Day BOD and suspended solids concentration were greatly in excess of the OWRC objectives.

An effluent sample, collected from the septic tank serving the McIntyre mines and office buildings, indicated that treatment of the sanitary wastes was satisfactory. A sample of the cooling water

being discharged to Pearl Lake from the mines showed that the suspended solids concentration was in excess of the Commission's maximum objective of 15 ppm. A coliform count of 9,300 was also obtained indicating fecal pollution. Since the cooling water is pumped from Pearl Lake, it is suspected that the bacteriological contamination of the cooling water may be introduced to Pearl Lake prior to pumping.

Samples collected from the Schumacher municipal septic tanks with effluents discharging to Pearl Lake indicated that the septic tanks may be malfunctioning. These septic tanks should be cleaned annually and chlorination of the final effluent should be considered.

With a considerable amount of septic-tank effluent being discharged to Pearl Lake it is suspected that the lake is polluted. The lake is not used for any recreational purposes. The effect of the pollution on the water quality was revealed by the samples collected from the creek draining Pearl Lake and from the creek draining Clearwater Lake. Both samples revealed coliform counts in excess of the Commission's maximum permissible level for surface waters.

The effluent sample collected from the septic tank serving the east end of Schumacher revealed a 5-Day BOD and suspended solids concentration in excess of the Commission's objectives of not greater than 15 ppm for both parameters. The effluent is discharged to a drainage ditch which runs in an easterly direction to a tributary

of the Porcupine River. Bacteriological examination of the water revealed that the water quality was adversely affected by the discharge of the final effluent.

The sample collected from the Gold Centre septic-tank outfall revealed that the 5-Day BOD and suspended solids concentration were also in excess of the Commission's objectives. Drainage of the effluent eventually reaches a tributary of the Porcupine River.

The septic tanks serving Dome Mines Limited were operating satisfactorily and outfall samples were within the Commission's objectives. However, a sample collected from a tributary of Porcupine River downstream from the outfalls revealed excessive bacteriological contamination.

A water sample was collected from the south branch of the Porcupine River at Highway No. 101. It is believed that drainage from the Schumacher east and Gold Centre septic tanks and Dome Mines septic tanks enters this tributary upstream. Examination revealed that the coliform concentration had reached the Commission's maximum permissible level of 2,400 coliforms per 100 c.c.

Further downstream sampling of the Porcupine River indicated that the bacteriological quality of the water was satisfactory.

Effluent samples from the septic tanks serving the Preston Mines revealed a high concentration of suspended solids. The effluents are discharged to a tailings area. Eventual drainage is

to South Porcupine River. Samples collected from South Porcupine River indicated that the quality of the water was satisfactory.

The two storm sewers located at the south ends of Moore and Main streets in South Porcupine discharge to Porcupine River. On the basis of the chemical analyses, samples collected from the outfalls revealed that the dry weather flows were within the Commission's objectives. However, considerable bacteriological contamination is shown by the examination of the samples collected from the storm sewers. It is possible that sanitary wastes are gaining access to the open ditches and storm sewers.

A sample of the Porcupine River at Evans Street downstream from the storm sewer outfalls indicated that the water quality was generally satisfactory.

The chemical analyses of an effluent sample from the South Porcupine Evans Street septic tank revealed that the 5-Day BOD and suspended solids concentration were in excess of the OWRC maximum objectives of not greater than 15 ppm for both parameters. A sample collected downstream from the municipal septic-tank outfall showed that the Porcupine River was impaired with bacteriological pollution.

The effluent sample, collected from the South Porcupine Rae Street septic tank, revealed that the 5-Day BOD and suspended solids concentration failed to meet the Commission's objectives. The water quality of Porcupine Lake downstream from the outfall was

adversely affected.

Samples, collected from Porcupine Lake at the airways, revealed phenolic concentrations of 2.0 ppb at each location indicating pollution by oil. A total coliform count of 430,000 coliforms per 100 c.c. was obtained offshore from the Georgian Bay Airways. This greatly exceeds the Commission's maximum objective.

A water sample was collected from the mouth of the Porcupine River at Highway No. 101 where Porcupine River drains Porcupine Lake in the Township of Whitney. The sample revealed a total coliform count of 4,300 coliforms per 100 c.c.

IV REFUSE DISPOSAL

The refuse disposal site is located on Lot 3, Concession 3, in the Township of Tisdale. It is a burn and cover type of operation. No water pollution problems were reported in connection with the operation of this disposal site.

V SUMMARY AND CONCLUSIONS

A water pollution survey was made of the Township of Tisdale during the fall of 1965.

Main urbanization of the township occurs in the communities of Schumacher and South Porcupine. Schumacher obtains its water supply from the Hollinger Mines water works. Two wells supply the community of South Porcupine. Both communities are served by municipal septic-tank systems.

The township is located in a region known as the Porcupine area which is Canada's leading gold mining centre. The economy of the township is basically dependent on the mining developments within the area. The mines and mine townsites are served by septic-tank systems.

Most of the gold mines use the standard cyanidation extraction procedure. All the mines have tailings disposal basins with overflows draining towards the Frederick House River. In general, it appeared that adequate tailings disposal facilities were being maintained.

The laboratory results of samples collected from the outfalls and watercourses within the township indicate that contaminated wastes are being discharged into Pearl Lake and Porcupine Lake. It is noted that the water quality of Porcupine River downstream from the South Porcupine municipal septic tank was adversely affected. The water quality of the South Porcupine River showed no significant pollution at the time of sampling, although partly treated domestic and industrial wastes were gaining access to the river.

In recent years, there has been little change in the populations of the communities of Schumacher and South Porcupine. Post-chlorination facilities should be considered to treat final effluent from the municipal septic tanks in Schumacher and South Porcupine. If an appreciable increase in population occurs within the communities, the present sewage disposal system would probably be inadequate and

further sewage treatment facilities would have to be provided by the Township of Tisdale.

To greatly improve the water quality of surface waters within the township, the mining companies would also have to improve their waste treatment systems.

VI RECOMMENDATIONS

1. Post-chlorination facilities should be considered by the Township of Tisdale to treat final effluents from the septic tanks serving the communities of Schumacher and South Porcupine.

2. If expansion of the communities of Schumacher and South Porcupine occurs, action should be taken by the Township of Tisdale to provide adequate sewage treatment facilities.

3. The Hollinger Consolidated Gold Mines Limited should eliminate the discharge of polluting wastes to the watercourse draining to Pearl Lake.

4. The McIntyre Porcupine Mines Limited should eliminate the discharge of polluting wastes to Pearl Lake.

5. The Dome Mines Limited should eliminate the discharge of polluting wastes to the tributary of Porcupine River.

6. Precautions should be taken by the Georgian Bay Airways Limited and the Austin Airways Limited to eliminate the discharge of fuel-oil to Porcupine Lake.

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Approved by C.E. McIntyre

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APPENDIX

WATER QUALITY AND EFFLUENT OBJECTIVES

The OWRC objectives for surface waters in Ontario are as follows:

5-Day BOD - not greater than 4 ppm
Total Coliform Count - not greater than 2,400 coliforms per 100 c.c.
Phenolic Equivalents - average - not greater than 2 ppb
- maximum - not greater than 5 ppb
pH Range - 6.7 to 8.5

A few pertinent maximum limits of contaminants in storm sewers, sewage treatment plant and industrial waste effluents are listed below. Adequate protection for surface waters, except in certain specific instances influenced by local conditions, should be provided if the concentrations and pH range are not exceeded.

5-Day BOD - not greater than 15 ppm
Suspended Solids - not greater than 15 ppm
Phenols - not greater than 20 ppb
pH - 5.5 to 10.6
Iron - not greater than 15 ppm
Ether Solubles (oil) - not greater than 15 ppm.

GLOSSARY OF TERMS

Bacteriological Examinations - The Most Probable Number technique is used by the Ontario Department of Health to obtain an approximation of the actual number of coliform organisms present. These organisms are the normal inhabitants of the intestines of man and other warm-blooded animals. They are always present in large numbers in untreated sewage and are, in general, relatively few in number in other stream pollutants.

Biochemical Oxygen Demand (BOD) - The biochemical oxygen demand test indicates the amount of oxygen required for stabilization of the decomposible organic matter found in sewage, sewage effluent, polluted waters, or industrial wastes, by aerobic biochemical action. The time and temperature used are five (5) days and 20°C, respectively.

Solids - The analyses for solids include tests for total, suspended, and dissolved solids. The total solids is a measure of the solids in solution and in suspension. Suspended solids indicate the measure of undissolved solids of organic or inorganic nature whereas the dissolved solids are a measure of those solids in solution.

Oils and Ether Soluble Materials - These include oils and all other ether soluble materials such as tarry substances and greases. The presence of these pollutants renders water difficult and sometimes impractical to treat, either for industrial or domestic use. Oils make streams unsightly and water unfit for bathing.

Phenolic Compounds - Phenols react with chlorine to produce intensely aromatic compounds. These compounds, even when highly diluted, may give a taste and odour to the water which is variously described as medicinal, chemical, or iodoform. Phenols taint fish and are toxic to fish, depending on the concentration. Normal water contains no phenolic compounds.

CORPORATION OF THE TOWNSHIP OF TISDALE

TABLE I

SCHUMACHER WATER SUPPLY

PLANT RECORDS

1964

Month	Water Pumped (Gallons)	Sodium Fluoride Usage (Pounds)	Sodium Fluoride Dosage as Fluoride (ppm)
January	5,818,500	130.0	1.00
February	4,963,100	81.4	0.74
March	5,409,700	121.0	1.01
April	5,560,900	123.1	1.00
May	5,232,300	117.8	1.01
June	--	--	--
July	5,332,400	111.6	0.94
August	5,112,000	110.0	0.97
September	4,739,700	103.9	0.99
October	4,948,300	112.3	1.02
November	5,214,200	101.2	0.87
December	4,821,400	94.3	0.88
TOTAL	57,152,500	1,206.6	

Average Daily Water Pumpage - 170,604 gallons
Total Average Fluoride Dosage - 0.95 ppm.

TABLE I (CONT'D)

1965

Month	Water Pumped (Gallons)	Sodium Fluoride Usage (Pounds)	Sodium Fluoride Dosage as Fluoride (ppm)
January	5,093,800	113.0	1.00
February	4,595,400	83.1	0.81
March	6,604,300	122.1	0.83
April	6,050,400	127.8	0.95
May	4,292,800	85.0	0.89
June	4,877,000	103.4	0.95
July	4,953,800	110.2	1.00
August	4,720,800	--	--
September	5,286,300	--	--
October	5,580,400	121.0	0.97
November	5,362,800	113.4	0.95
December	4,939,300	86.2	0.79
TOTAL	62,357,100	1,065.2	

Average Daily Water Pumpage - 170,841 gallons

Total Average Fluoride Dosage - 0.92 ppm

CORPORATION OF THE TOWNSHIP OF TISDALE

TABLE II

SOUTH PORCUPINE WATER WORKS

PLANT RECORDS

1964

WELL NO. 1

Month	Water Pumped (gallons)	Chlorine Usage (pounds)	Average Chlorine Dosage (ppm)	Sodium Fluoride Usage (pounds)	Average Fluoride Dosage (ppm)
January	3,687,900	32.5	0.88	39.2	0.48
February	6,345,800	47.0	0.74	140.7	0.98
March	7,364,200	63.0	0.86	161.8	0.97
April	6,914,100	57.0	0.83	121.8	0.78
May	3,155,600	27.0	0.86	71.3	1.00
June	3,376,500	28.5	0.85	77.6	1.01
July	5,485,500	45.5	0.83	126.3	1.04
August	4,905,100	37.5	0.76	110.6	1.01
September	-	-	-	-	-
October	6,093,500	62.5	1.03	133.7	0.99
November	6,907,100	74.0	1.07	155.6	1.01
December	5,466,700	55.5	1.02	124.2	1.02
TOTAL	59,702,000	530.0	0.89	1,262.8	0.95

WELL NO. 2

January	11,224,500	71.0	0.63	254.6	1.00
February	7,425,100	59.6	0.80	164.6	0.98
March	7,734,300	62.5	0.81	172.9	0.98
April	8,090,600	63.2	0.78	181.0	0.99
May	12,237,400	77.3	0.63	272.6	0.98
June	11,680,300	78.0	0.67	256.2	0.97
July	11,390,800	50.0	0.44	253.0	1.00
August	9,845,100	88.0	0.89	218.9	1.00
September	14,445,600	121.0	0.84	312.6	0.97
October	10,139,500	86.5	0.85	230.2	1.02
November	8,807,700	74.0	0.84	196.5	1.00
December	11,495,000	97.5	0.85	246.1	0.96
TOTAL	124,515,900	928.6	0.75	2,759.2	1.00

TABLE II (CONT'D)

Total Water Pumpage - 184,217,900 gallons

Average Daily Water Pumpage - 503,328 gallons

Total Chlorine Used - 1,458.6 pounds

Total Sodium Fluoride Used - 4,022.0 pounds

TABLE II (CONT'D)

PLANT RECORDS

1965

WELL NO. 1

Month	Water Pumped (gallons)	Chlorine Usage (pounds)	Average Chlorine Dosage (ppm)	Sodium Fluoride Usage (pounds)	Average Fluoride Dosage (ppm)
January	6,516,200	72.5	1.11	146.8	1.01
February	5,353,300	60.5	1.13	112.5	0.95
March	9,149,900	97.0	1.06	192.0	0.86
April	10,289,100	94.0	0.91	204.3	0.89
May	10,020,600	80.5	0.80	220.8	0.99
June	11,121,800	92.5	0.83	247.7	1.00
July	10,544,600	78.5	0.74	210.8	0.90
August	11,563,900	96.0	0.83	224.5	0.87
September	9,541,800	78.5	0.82	216.4	1.02
October	9,508,900	83.0	0.79	211.4	1.01
November	7,026,100	55.5	0.79	158.0	1.01
December	3,935,600	28.7	0.73	79.1	0.90
TOTAL	104,571,800	917.2	0.88	2,224.3	0.96

WELL NO. 2

January	11,959,600	100.0	0.84	263.8	0.99
February	12,170,700	121.5	1.00	273.7	1.01
March	12,035,800	133.0	1.10	247.3	0.92
April	11,711,200	101.0	0.86	259.0	1.00
May	9,672,200	67.0	0.69	208.3	0.97
June	11,247,900	95.0	0.84	236.8	0.95
July	7,363,400	58.5	0.79	160.8	0.98
August	6,064,700	-	-	134.1	0.99
September	4,631,100	59.0	1.27	100.1	0.97
October	6,046,100	39.5	0.65	133.7	1.00
November	8,630,400	58.5	0.68	177.1	0.92
December	11,981,800	62.3	0.52	268.2	1.01
TOTAL	113,514,900	895.3	0.84	2,462.9	0.98

Total Water Consumption - 218,086,700 gallons
Average Daily Water Consumption - 597,498 gallons
Total Chlorine Used - 1,212.5 pounds
Total Sodium Fluoride Used - 4,687.2 pounds

CORPORATION OF THE TOWNSHIP OF TISDALE

TABLE III

SCHUMACHER WATER POLLUTION CONTROL PLANTS

SUMMARY OF ANALYSES

1964

NO. 1 Septic Tank - Railway Street

	Raw Sewage		Final Effluent		% Removal	
Month	BOD (ppm)	Susp.Solids (ppm)	BOD (ppm)	Susp.Solids (ppm)	BOD (ppm)	Susp.Solids (ppm)
January 6	420	321	295	276	29.8	14.0
February 4	940	642	275	279	70.8	56.5
March 3	380	316	185	242	51.3	23.4
March 30	315	270	260	260	17.4	3.7
May 11	140	110	58	48	58.6	56.4
June 1	77	82	110	84	-	-
July 6	135	124	100	66	25.9	46.8
September 4	100	90	155	88	-	2.2

NO. 2 Septic Tank - First Avenue

January 6	220	355	122	132	44.6	62.8
February 4	155	394	155	167	0.0	57.6
March 3	450	276	106	92	76.5	66.7
March 30	200	322	146	106	27.0	67.1
May 11	38	96	31	39	18.4	59.4
June 1	36	80	470	706	-	
July 6	150	154	500	686	-	-
September 4	80	116	1,020	1,830	-	-

NO. 3 Septic Tank - Schumacher East

January 6	118	94	63	40	46.6	57.5
February 4	132	191	78	56	40.9	70.7
March 3	520	1,118	82	52	84.2	95.4
March 30	126	188	126	66	0.0	64.8
May 11	38	112	18	25	52.7	77.6
June 1	24	28	20	42	16.7	-
July 6	16	48	26	74	-	-
September 4	315	318	66	64	79.0	79.8

TABLE III (CONT'D)

NO. 4 Septic Tank - Gold Centre

Month	Raw Sewage BOD (ppm)	Raw Sewage Susp.Solids (ppm)	Final Effluent BOD (ppm)	Final Effluent Susp.Solids (ppm)	% Removal BOD (ppm)	% Removal Susp.Solids (ppm)
January 6	265	282	124	72	53.2	74.5
February 4	330	834	84	71	74.5	91.6
March 3	490	782	88	66	82.0	91.6
March 30	200	268	108	80	46.0	70.2
May 11	98	78	43	72	56.1	7.7
June 1	155	134	52	82	66.5	38.8
July 6	230	616	19	32	91.8	94.6
September 4	280	728	82	56	70.7	92.4

CORPORATION OF THE TOWNSHIP OF TISDALE

TABLE IV

SOUTH PORCUPINE WATER POLLUTION CONTROL PLANTS

SUMMARY OF ANALYSES

1964

NO. 1 Septic Tank - Evans Street

Month	Raw Sewage BOD (ppm)	Raw Sewage Susp.Solids (ppm)	Final Effluent BOD (ppm)	Final Effluent Susp.Solids (ppm)	% Removal BOD (ppm)	% Removal Susp.Solids (ppm)
January 7	98	62	82	41	16.3	33.9
February 3	112	80	90	55	19.6	31.3
March 2	58	60	96	40	-	33.3
March 20	185	150	108	82	41.6	45.3
May 12	56	59	46	50	17.8	15.3
June 1	65	62	39	60	40.0	3.2
July 7	76	104	86	64	-	38.5

NO. 2 Septic Tank - Rae Avenue

January 7	92	100	96	62	-	38.0
February 3	116	113	90	76	22.4	41.6
March 2	130	188	88	58	32.3	69.2
March 20	260	378	142	90	45.4	76.3
May 12	80	88	36	41	55.0	53.4
June 1	77	78	55	60	28.6	23.1
July 7	40	60	25	34	37.5	45.0

CORPORATION OF THE TOWNSHIP OF TISDALE

TABLE V

SCHUMACHER WATER POLLUTION CONTROL PLANTS

SUMMARY OF ANALYSES

1965

NO. 1 Septic Tank - Railway Street

Month	Raw Sewage BOD (ppm)	Raw Sewage Susp.Solids (ppm)	Final Effluent BOD (ppm)	Final Effluent Susp.Solids (ppm)	% Removal BOD (ppm)	% Removal Susp.Solids (ppm)
March 9	350	388	900	1,184	-	-
April 5	235	386	130	180	44.7	53.4
May 3	80	90	68	153	15.0	-
May 31	48	81	44	50	8.3	38.3
Sept. 20	130	148	280	644	-	-
NO. 2 Septic Tank - First Avenue						
March 9	230	256	190	110	17.4	57.1
April 5	195	226	410	858	-	-
May 3	76	74	104	92	-	-
May 31	44	138	42	71	4.5	48.6
Sept. 20	72	132	150	300	-	-
NO. 3 Septic Tank - Schumacher East						
March 9	9.8	24	13	16	-	33.3
April 5	96	133	24	28	75.0	79.0
May 3	44	65	32	59	27.3	9.2
May 31	44	74	9.2	19	79.1	74.4
Sept. 20	60	76	29	22	51.6	71.0
NO. 4 Septic Tank - Gold Centre						
March 9	210	268	8.8	14	95.8	94.8
April 5	165	108	7.6	15	95.4	86.9
May 3	35	108	15	50	57.2	53.7
May 31	22	47	57.5	20	69.1	57.5
Sept. 20	4.8	166	21	89	-	46.4

CORPORATION OF THE TOWNSHIP OF TISDALE

TABLE VI

SOUTH PORCUPINE WATER POLLUTION CONTROL PLANTS

SUMMARY OF ANALYSES

1965

NO. 1 Septic Tank - Evans Street

	Raw Sewage		Final Effluent		% Removal	
Month	BOD (ppm)	Susp.Solids (ppm)	BOD (ppm)	Susp.Solids (ppm)	BOD (ppm)	Susp.Solids (ppm)
March 10	66	69	56	59	15.2	14.5
April 6	48	70	49	54	-	22.8
May 4	38	47	36	27	5.3	42.6
June 1	34	59	40	35	-	40.7
Sept. 20	74	66	53	48	28.4	27.3
NO. 2 Septic Tank - Rae Avenue						
March 10	34	526	40	235	-	55.3
April 6	54	66	54	84	0.0	-
May 4	54	72	36	47	33.4	34.7
June 1	38	72	15	39	60.6	45.8
Sept. 20	37	52	46	45	-	13.5

TABLE VII

PORCUPINE RIVER

Sampling Point No.	Description	Date	5-Day BOD (ppm)	Solids Total (ppm)	Solids Susp. (ppm)	Solids Diss. (ppm)	MPN* Total Coliform Organisms per 100 c.c.	MPN* E.coli per 100 c.c.
P-23.9	Porcupine River downstream from South Porcupine No. 1 Evans St. WPCP outfall.	Sept.20/65	2.6	572	5	567	15,000	240
P-24.0 T	South Porcupine No. 1 Evans St.WPCP outfall.	Sept.20/65	53	492	48	444		24,000,000+
P-24.0 W-1	6-Inch diameter iron storm sewer.	Sept.20/65	No Flow Noted					
P-24.0 W-2	10-Inch diameter concrete storm sewer.	Sept.20/65	Insufficient Flow					
P-24.0	Porcupine River at Evans St.	Sept.20/65	1.2	564	3	561	240	0
P-24.3 W	14-Inch concrete storm sewer at Main St.	Sept.21/65	2.0	284	10	274	430,000	2,400
P-24.5 W	24-Inch concrete storm sewer at Moore St.	Sept.21/65	1.8	334	4	330	15,000	23
P-25.0	Porcupine River at Golden Avenue.	Sept.20/65	2.0	684	5	679	43	0

TABLE VII (CONT'D)

Sampling Point No.	Description	Date	5-Day BOD (ppm)	Solids Total (ppm)	Solids Susp. (ppm)	Solids Diss. (ppm)	MPN* Total Coliform Organisms per 100 c.c.	E.coli per 100 c.c.
P-25.5	Porcupine River at Hwy. #101 west of South Porcupine.	Sept.21/65	1.6	704	2	702	93	0
P-28.6	Tributary of Porcupine River downstream from Clearwater Lake.	Oct.20/65	1.6	784	1	783	15,000	23
P-29.1	Tributary of Porcupine River downstream from Pearl Lake.	Oct.20/65	3.2	870	8	862	150,000	24,000
P-29.8 T	Schumacher No. 2 First Avenue WPCP outfall.	Sept.20/65	150	580	300	280		24,000,000+
P-29.9 T	McIntyre Mines office septic-tank outfall.	Oct.19/65	7.6	170	3	167		24,000,000+
P-29.9 I	McIntyre Mines - 10-Inch diameter woodstave.	Oct.19/65	Not Sampled					
P-30.0 I	McIntyre Mines - 12-Inch diameter corrugate iron - cooling water.	Oct.19/65	11.4	1,856	24	1,832	9,300	240

TABLE VII (CONT'D)

Sampling Point No.	Description	Date	5-Day BOD (ppm)	Solids Total (ppm)	Solids Susp. (ppm)	Solids Diss. (ppm)	MPN* Total Coliform Organisms per 100 c.c.	MPN* E.coli per 100 c.c.
P-30.0 T	Schumacher - No.1 Railway St. WPCP outfall.	Sept.20/65	280	964	644	320	4,600,000	2,400
P-30.1 T	McIntyre Community Arena septic-tank outfall.	Oct.19/65	730	1,332	1,092	240	24,000,000	240,000
P-30.2	Creek draining McIntyre Park.	Sept.21/65	1.5	734	8	726	2,100	23
P-30.3 D	Drainage ditch downstream from Hollinger Mines.	Oct.20/65	2.0	1,050	74	976	4,300	0
P-30.3 T	Hollinger Mines - Steel Shop 10-Inch diameter woodstave septic-tank outfall.	Oct.19/65	2.6	116	7	109		2,400,000
P-30.3 T-2	Hollinger Mines - No.11 Change House 10-Inch diameter woodstave septic-tank outfall.	Oct.19/65	4.6	982	29	953		43,000

TABLE VII (CONT'D)

Sampling Point No.	Description	Date	5-Day BOD (ppm)	Solids Total (ppm)	Solids Susp. (ppm)	Solids Diss. (ppm)	MPN* Total Coliform Organisms per 100 c.c.	MPN* E.coli per 100 c.c.
P-30.3 T-3	Hollinger Mines - Central Hoist House - 18-Inch concrete septic-tank outfall.	Oct.19/65	0.7	114	4	110		2,400,000
P-30.3 T-4	Hollinger Mines - Main Offices and Refinery - 8-Inch woodstave septic-tank outfall.	Oct.19/65	3.6	3,614	14	3,600	0	0
P-30.3 T-5	Hollinger Mines - No. 19 Hoist House septic-tank effluent.	Oct.19/65	57	2,800	18	2,782	15,000	240

P-30.3 T-5 - Ether Solubles (ppm) - 13.2

TABLE VIII

PORCUPINE RIVER SOUTH BRANCH

Sampling Point No.	Description	Date	5-Day BOD (ppm)	Solids Total (ppm)	Solids Susp. (ppm)	Solids Diss. (ppm)	MPN* Total Coliform Organisms per 100 c.c.	E.coli per 100 c.c.
PS-28.0	South Branch of Porcupine River at Hwy. #101.	Sept.21/65	1.0	506	3	503	2,400	0
PSB-29.0 T	Schumacher - No.4 WPCP final effluent.	Sept.20/65	21	498	89	409		24,000,000+
PSA-29.0 (1)	Tributary down-stream from Schumacher WPCP outfall.	Oct.18/65	2.2	186	1	185	4,600,000	0
PSA-29.0 D	Drainage ditch receiving effluent from Schumacher WPCP.	Oct.18/65	18	330	50	280		24,000,000+
PSA-29.0 T	Schumacher No. 3 WPCP final effluent.	Sept.20/65	29	344	22	322		24,000,000+
PSA-29.0 (2)	Tributary up-stream from Schumacher No.3 WPCP.	Oct.18/65	0.6	276	2	274	7.3	0

TABLE VIII (CONT'D)

Sampling Point No.	Description	Date	5-Day BOD (ppm)	Solids Total (ppm)	Solids Susp. (ppm)	Solids Diss. (ppm)	MPN* Total Coliform Organisms per 100 c.c.	MPN* E.coli per 100 c.c.	EST DWF (gpm)
PS-29.6 D	Drainage ditch downstream from Dome Mines outfalls.	Sept.21/65	1.6	800	12	788		43,000	
PS-29.6 I	Dome Mines - 10-Inch diameter woodstave outfall.	Sept.21/65	Insufficient Flow						
PS-29.6 W	Dome Mines - 12-Inch diameter asbestos storm sewer.	Sept.21/65	1.6	442	9	433	930,000	240,000	10
PS-29.6 T-1	Dome Mines 2-8-Inch diameter woodstave - mine office septic-tank final effluent.	Sept.21/65	3.2	534	17	517		24,000,000	
PS-29.6 I-1	Dome Mines - 10-Inch diameter woodstave.	Sept.21/65	No Flow Noted						
PS-29.6 T-2	Dome Mines - 6-Inch diameter iron mill septic-tank final effluent.	Sept.21/65	11.0	248	10	238		4,600,000	1.0

TABLE VIII (CONT'D)

Sampling Point No.	Description	Date	5-Day BOD (ppm)	Solids Total (ppm)	Solids Susp. (ppm)	Solids Diss. (ppm)	MPN* Total Coliform Organisms per 100 c.c.	MPN* E.coli per 100 c.c.	EST DWF (gpm)
PS-29.6 I-2	Dome Mines - 2-8-Inch diameter iron mill wastes.	Sept.21/65	1.6	934	6	928	460	0	60
PS-29.6 I-3	Dome Mines - 8-Inch diameter iron.	Sept.21/65	No Flow Noted						
PS-29.9 T	Paymaster Mines septic-tank final effluent.	Oct. 19/65	3.8	612	7	605		210,000	

TABLE IX

SOUTH PORCUPINE RIVER

Sampling Point No.	Description	Date	5-Day BOD (ppm)	Solids Total (ppm)	Solids Susp. (ppm)	Solids Diss. (ppm)	MPN* Total Coliform Organisms per 100 c.c.	MPN* E.coli per 100 c.c.
SP-0.0	South Porcupine River upstream from confluence with Porcupine River.	Sept.20/65	0.8	332	2	330	240	0
SP-0.4 T	Dome Extension Community WPCP final effluent.	Sept.21/65	24	426	24	402		24,000,000
SP-1.0	South Porcupine River at Dome Extension Road.	Oct.18/65	1.0	232	1	231	75	23
SP-1.3 T	Preston Mines Townsite WPCP final effluent.	Oct.18/65	21	278	33	245		24,000,000
SP-1.5 D	Drainage ditch downstream from Preston Mines Site.	Oct.18/65	0.6	696	4	692	20	0
SP-1.5 T-1	Preston Mines - office septic-tank final effluent.	Oct.18/65	4.6	478	90	388		24,000,000+
SP-1.5 T-2	Preston Mines Townsite septic-tank final effluent.	Oct.18/65	4.4	1,298	26	1,272		24,000,000+

TABLE X

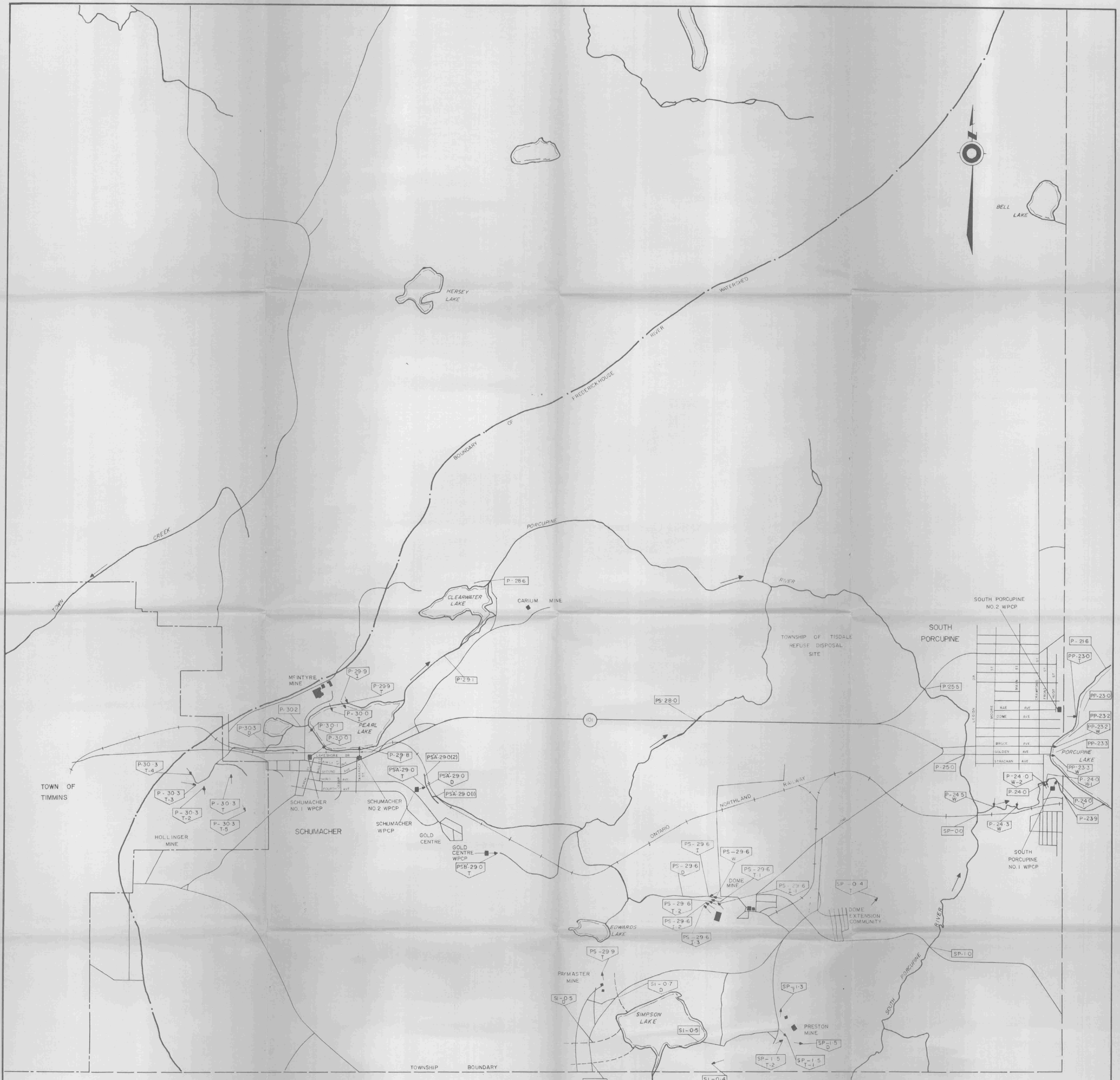
SIMPSON LAKE

Sampling Point No.	Description	Date	5-Day BOD (ppm)	Solids Total (ppm)	Solids Susp. (ppm)	Solids Diss. (ppm)	MPN* Total Coliform Organisms per 100 c.c.	MPN* E.coli per 100 c.c.
SI-0.7 D	Drainage ditch from Paymaster Mines area.	Oct.18/65	0.6	214	7	207	240	0
SI-0.5 D	Drainage ditch to Simpson Lake.	Oct.18/65	0.7	932	2	930	110	0
SI-0.5	Simpson Lake at Preston Mines water works.	Oct.18/65	1.2	322	3	319	240	0
SI-0.4 D	Drainage ditch to Simpson Lake.	Oct.18/65	1.2	1,712	1	1,711	1,100	0
SI-0.4 I	Outfall from Preston Mines Tailings Dam.	Oct.18/65	0.8	392	3	389	0	0

TABLE XI

PORCUPINE LAKE

SAMPLING POINT NO.	DESCRIPTION	DATE	5-DAY BOD (PPM)	SOLIDS TOTAL (PPM)	SOLIDS SUSP. (PPM)	SOLIDS DISS. (PPM)	PHENOLS IN (PPB)	TOTAL COLIFORM MPN* ORGANISMS PER 100 C.C.	E.COLI PER 100 C.C.	EST DWF (GPM)
PP-23.3 W	18-INCH DIAMETER CONCRETE STORM SEWER AT GOLDEN AVENUE.	SEPT.20/65	NOT SAMPLED - PARTIALLY SUBMERGED							
PP-23.3	PORCUPINE LAKE AT AUSTIN AIRWAYS LIMITED.	SEPT.20/65	2.0	454	2	452	2	150	0	DISTINCT FUEL OIL ODOUR.
PP-23.2 W	12-INCH CONCRETE STORM SEWER AT BRUCE AVENUE.	SEPT.20/65	2.4	696	3	693		460	0	I
PP-23.2	PORCUPINE LAKE AT GEORGIAN BAY AIRWAYS.	SEPT.20/65	3.0	452	4	448	2	430,000	240	VERY FAINT FUEL OIL ODOUR.
PP-23.0	PORCUPINE LAKE AT SOUTH PORCUPINE RAE ST. WPCP OUTFALL.	SEPT.20/65	4.6	362	19	343		24,000,000	23	
PP-23.0 T	SOUTH PORCUPINE RAE ST. WPCP FINAL EFFLUENT.	SEPT.20/65	46	468	45	428			24,000,000+	
P-21.6	PORCUPINE RIVER DOWNSTREAM FROM PORCUPINE LAKE AT HWY. #101.	SEPT.20/65	2.2	464	3	461			4,300	0



LEGEND

PS-28-0 – STREAM SAMPLING POINT SHOWING MILEAGE

P-303 D – OUTFALL SHOWING STREAM AND MILEAGE

TYPE OF OUTFALL

D – DRAINAGE OR DITCH

I – INDUSTRIAL WASTE EFFLUENT

T – TREAMENT PLANT EFFLUENT

W – STORM SEWER

ONTARIO WATER RESOURCES COMMISSION

TOWNSHIP OF TISDALE

WATER POLLUTION SURVEY 1965

SCALE: 0 1/8 1/4 1/2 3/4 1 Mi.

DRAWN BY: A. L. | DATE: AUG. 1966

CHECKED BY: | DRAWING No. 66 – 57